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IMPACT OF INDUSTRIAL TECHNOLOGY EDUCATION ON ACQUISITION OF ENGINEERING SKILLS AMONG TECHNOLOGY EDUCATION STUDENTS' IN TVET INSTITUTIONS IN RIVERS STATE

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Abstract
The study investigated Impact of Industrial Technology Education on Acquisition of Engineering Skills among Technology Education Students in Technical and Vocational Education and Training Institutions in Rivers state. Three research questions and three hypotheses guided the study. The study adopted a descriptive survey design. The population of the study consisted of 223 respondents made up of 88 Lecturers and 135 final year technology education students'. Simple random sampling technique was used to select 100 students while all the 88 lecturers were used in the study without sampling because their population size is considered manageable. A self-structured instrument titled "Impact of Industrial Technology Education on acquisition of Engineering Skills among Technology Education students' in TVET Institutions Questionnaire" (IITEESQ) was designed to obtain information from the respondents. Mean and standard deviation were used to answer the research questions while t-test was used to test the null hypotheses at 0.05 level of significance. The study revealed among others, that access to functional workshops, exposure to modern equipment, and participation in industrialtraining/work experience directly improve students competence in machine operation, fault diagnosis, technical drawing interpretation, and adherence to safety and quality standards. Based on this findings, it was recommended among others, that TVET Institutions should prioritize modernizing workshops with functional industry-standard machines and tools, and institutions should formalize partnership with industries around them in Rivers State.
Keywords: Industrial technology, engineering skills, technology education, students.

Introduction
In Nigeria Technical and Vocational Education and Training (TVET) institutions serve as the back-bone for producing middle-level technical manpower needed to drive industrial and technological development. Okenwa and Izuchukwu (2025) stated that TVET are form of educational programmes that furnishes its students with not only theoretical knowledge and pedagogical skills but also hand-on-experience in the various aspects of engineering and technology.

According to Willcook and Karibi (2025) the persistent gap between industrial demand and graduate competence has raised concerns about the quality of skills acquired by students, especially in engineering related areas. Employers frequently report that many TVET graduates lack necessary practical engineering skills required for effective

performance in the workplace when they are employed in the industries. Industrial Technology Education is a core component of Technology Education programmes in TVET institutions. Eke and Taiwo (2024) posited that Industrial Technology education programmes are designed to equip students with theoretical knowledge and hand-on-experience in materials, processes, tools and systems used in industry. Through workshop practice, technical drawing, machine operations, and project works, students are expected to develop competencies such as fabrication, maintenance, problem-solving and design skills. These engineering skills are critical for self-reliance, employment and national technological advancement.

According to Maduka and Uwem (2026) programmes in Industrial Technology Education include; Electrical/Electronic Technology, Building Technology, Mechanical Technology, Automobile Technology, Wood work Technology among others. In Rivers State there are several TVET institutions that offer Technology Education programs with Industrial Technology Education component.

However, the state continues to experience youth unemployment and underemployment among technical education graduates. Several studies such as (Edemede & Mark, 2025; Haruna & Wale, 2025) observation and preliminary reports suggested that inadequate workshop facilities, outdated equipment, and limited industrial exposure may hinder students from acquiring relevant engineering skills. Okonkwo and Uzorka (2023) echoed that without proper skills, graduates of Industrial Technology Education in Nigeria cannot meet industry standards or contribute meaningfully to the industrial sector of the nation. Rashford and Hills (2025) posited that another factor influencing skills acquisition is Industrial Training or Students Industrial Work Experience Scheme (SIWES). SIWES program is the only training programme that is intended to bridge the gap between theory and practices by exposing students to real work environment. Yet the effectiveness of SIWES and the functionality of school workshops in Rivers State TVET institutions remain subject of debate among stakeholders in education. There is an urgent need to establish empirically the types of engineering skills that Technology Education students should possess, and how workshop facilities and industrial training influence their engineering skills acquisition during the period of their training.

The study therefore investigate the impact of Industrial Technology Education on Acquisition of Engineering Skills among Technology Education students in TVET institution in Rivers State. Findings of this study will provide data for curriculum planners, TVET administrators, and policy makers to improve instructional delivery, upgrade facilities and strengthen school-industry linkage for better skill development of Technology Education graduates in Rivers State.

Theoretical and Conceptual Clarifications

Skill Acquisition Theory Developed by Fitts and Posner (1967)

Fits and Posner are American psychologists who developed the skill Acquisition Theory in 1967. The Theory states that learning any motor or cognitive skill happens in three distinct stages namely; cognitive stage that deals with “What to do”. In this stage the learner is a complete novice, they need to understand the task and figure out what steps are involved to carry out a particular task. The second stage is the Associative stage that deals with “How to do it better”. In this stage the learner has grasped the basics and now practice to refine the skills. Errors decrease and patterns form. The third stage according to Fitts and Posner is the Autonomous stage that deals with “Doing with thinking”.

In this stage the skill becomes automatic and can be performed while doing other tasks. The key points of Skill Acquisition Theory include that progression is not automatic therefore one can only move to the next stage through deliberate practice and feedback, time varies, some people stay in the association stage for years if they don’t practice enough, not everyone reaches autonomous stage, complex skill may never become fully automatic, feedback needs change, cognitive stage needs lots of verbal guidance as autonomous stage

needs minimal feedback. The basic fact about Skill Acquisition Theory is that the theory is used widely in sports coaching vocational training, nursing and TVET for design instruction based on the learner's stage. The relevance of Skill Acquisition Theory to this study stems from the fact that Skill Acquisition Theory provides a clear framework for understanding how Technology Education Students acquire engineering skills through Industrial Technology in TVET institutions.

The theory serves as a benchmark for assessing the level of engineering skills attained by students. Also, the theory guides the conceptualization of the dependent variable acquisition of engineering skills as a progressive process that can be measured based on the characteristics of each stage. It also justifies the need for practical components in TVET curriculum as progression through the stages depends on deliberate practice, feedback, and repetition which Industrial Technology Education is designed to provide.

Concept of Industrial Technology Education

Industrial Technology Education is a component of Technology Education that focuses on preparing individuals with knowledge, skills, and attitude required for occupations in industry, manufacturing and, related technical fields. Okowa and Ibe (2024) stressed that Industrial Technology Education is a training programme in Nigeria that equip individuals with practical skills, knowledge and competence necessary for specific trades, industries or professions.

In the same vein, Agwi and Ogadema (2025) posited that Industrial Technology Education is a programme that focuses on hand – on – real work applications, preparing learners for direct entry into the workplace. Similarly, Edemede and Mark (2025) maintained that Industrial Technology Education is a programme that combines classroom theory with practical workshop and industrial experience to develop competencies in tools, machines, processes, and systems used in modern industries. Industrial Technology Education is the training that turns students into skilled technical manpower for industries. The goals of Industrial Technology Education in Nigeria include; to provide the trained manpower in the applied sciences, technology and business particularly at craft and advance craft and technical level, to provide the technical skills necessary for agriculture, commercial, and economic development, and to give training and impact the necessary kills to individual for self-reliance economically (FRN, 2013).

The Concept of Engineering Skills

Engineering skills according to Huges and Bread (2025) are set of technical cognitive and personal competencies that enable an individual to apply scientific and mathematical principles to design, create, operate, maintain, and improve machines, structure, systems and processes. In TVET context engineering skills are the measureable abilities a student of Technology Education required to function effectively as a technician, technologist or craftman in an engineering environment upon graduation.

Similarly, Donelly and Green (2014) stated that engineering skills are measurable competencies demonstrated by Technology Education students in performing tasks related to their area of specialization. These skills are operationalized as the student's ability to perform technical operations accurately, apply cognitive knowledge to practice, demonstrate safe and standard work practices, work with speed and independence and exhibit workplace/safety competencies. Fraser and Parker (2025) maintained that types of engineering skills that Technology Education students who that specialized in any of the Industrial Technology Education related areas such as in Building Technology, Mechanical Technology, Automobile Technology, Electrical/Electronics Technology and Wood Work Technology required to acquire during their training period include; core technical psychomotor skills, cognitive/analytical engineering skills, design and production skills, digital and emerging technology skills, safety quality entrepreneurial engineering skills. Haruna and Wale (2025)

posited that to efficiently acquire effective engineering skills by Technology Education students that adequate workshop facilities must be available in all the TVET institutions. Workshop facilities are the "engine room" of Industrial Technology Education programme.

Ogendu and Umejuru (2026) stated that without workshop facilities skill acquisition stays at the cognitive stage, students can only talk about skills but they will not perform them. Akor and Owuga (2024) posited that the influence of workshop facilities to engineering skills acquisition of students in TVET institutions include; that it provides the platform for learning by doing, it determines the type and level of skills that can be acquired, it influences quality of practice and feedback, it affects safety skill development, it determines exposure to modern/industry-standard technology, it influences students motivation and confidence and it affects teacher effectiveness, workshop facilities also impact assessment and certification integrity. Students' Industrial Training according to La and Idris (2026) is another crucial factor that influences skill acquisition of students in Industrial Technology Education Programmes.

Galadima and Akpan (2025) stated that students Industrial Training is the bridge between school workshop and real industry. It directly affects how fast and how well students move through the three stages of skill acquisition. Tamuno and Egba (2026) stressed that the influence of Students Industrial Training to students engineering skills acquisition in TVET institutions include that it provides real industrial exposure beyond school workshop, it enables repetition under production conditions, it facilitates learning of workplace-embeded skills, it provides industry-based feedback and mentorship, it builds confidence and professional identity, it exposes students to emerging technologists and specialization, and it tests transfer of school learning to real context. The Student Industrial Training usually exposes students to current machines, tools, and processes actually used in industries today, it also moves students from "school version" of a skill to "industry standard" of that skill.

Statement of the Problem

Industrial Technology Education in Nigeria has as one of the major goals, the inculcation of relevant engineering skills in the students for increased industrial productivity and national development. However, from recent observations, it was seen that graduates of Technology Education in Nigeria are found lacking in the area of effective engineering skills acquisition which makes it almost impossible for them to secure paid employment in the industries or become self-reliant upon their graduation thereby leading to increased poverty and criminality in the society.

According to Agwi and Ogadema (2025) the Nigerian Labour Market reports that Nigerian graduates do not possess the required employable engineering skills due to poor implementation of Industrial Technology Education curriculum.

In the same vein, Edemede and Mark (2025) stipulated that most Technology Education courses in Nigerian TVET institutions are taught almost theoretically due to poor state of practical training facilities. This study therefore seek to utilize Technology Education as a tool to address the menace of Technology Education students inadequate engineering skill acquisition in TVET institutions in Rivers State.

Purpose of the Study

The main purpose of the study is to investigate the impact of Industrial Technology Education on acquisition of engineering skills among Technology Education students in TVET institutions in River State. Specifically, the study sought to:

1. Investigate types of engineering skills that are needed to be acquired by technology education students in TVET institutions in Rivers State.
2. Investigate how the available workshop facilities influence engineering skills acquisition among technology education students in TVET institutions in Rivers State.
3. Examine the influence of students' Industrial Training/Work Experience on their acquisition of engineering skills through Industrial Technology Education in TVET institutions in Rivers State.

Research Questions

The following three research questions were posed by the researchers to guide the study:

1. What are the types of engineering skills that are needed to be acquired by technology education students in TVET institutions in Rivers State?
2. How are the available workshop facilities influencing engineering skills acquisition among technology education students in TVET institutions in Rivers State?
3. What are the influence of students' Industrial Training/Work Experience on their acquisition of engineering skills through industrial Technology Education in TVET institutions in Rivers State?

Hypotheses

The following null hypotheses were postulated and tested at 0.05 level of significance.

1. There is no significant difference in the mean responses of lecturers and students on types of engineering skills that are needed to be acquired by technology education students in TVET institutions in Rivers State.
2. There is no significant difference in the mean responses of lecturers and students on how available workshop facilities influence engineering skills acquisition among technology education students in TVET institutions in Rivers State.
3. There is no significant difference in the mean responses of lecturers and students on the influence of students' Industrial Training/Work Experience on their acquisition of engineering skills through Industrial Technology Education students in TVET institutions in Rivers State.

Methodology

The study adopted descriptive survey design. The study population consisted of 223 made up of 88 lecturers and 135 final year technology education students from the three TVET institutions in Rivers State that offer programmes in Industrial Technology Education. Simple random sampling technique was used to select 100 students while all the 88 lecturers were used in the study without sampling because their population size is considered manageable. Three research questions and three hypotheses guided the study. A self-structured 30-items questionnaire designed by the researchers and titled "Impact of Industrial Technology Education on Acquisition of Engineering skills among Technology Education Students in TVET Institutions Questionnaire" (IITEESQ) was the instrument used for data collection from the respondents. The instrument was constructed on a 4 point rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) corresponding to a numerical value of 4,3,2 and 1 respectively. The instrument was face and content validated by three experts in Technology Education from Michael Okpara University of Agriculture, Umudike, Abia State. The instrument reliability was ascertained via Cronbach's alpha correlation method in which a reliability coefficient of 0.85 was obtained. 188 copies of the instrument were distributed to the respondents directly by the researchers with the help of five research assistants. The total number of copies of the completed instrument retrieved after two weeks was 178 (86 lecturers and 92 students) representing 98 percent return. The completed instrument was considered adequate and were used for the analysis of the study.

Mean and standard deviation were used to answer the research questions while the null hypotheses were tested with t-test statistical technique at the 0.05 level of significance. To arrive at a decision on the research question it was decided that an item with a calculated mean value equal or greater than 2.50 (2.50 - 4.00) is accepted while an item is rejected if its mean value falls below the criterion mean of 2.50. The standard deviation was used to determine the homogeneity or otherwise of the respondents mean rating. In testing the hypotheses, the null hypotheses were not rejected if the calculated t-value is less and equal to the critical t-value on the other hand were the calculated t-value is greater than the critical t-value the null hypotheses were rejected.

Results

The results of the study are presented in accordance with the research questions and hypotheses that guided the study.

Research Question 1: What are the types of engineering skills that are needed to be acquired by technology education students in TVET institutions in Rivers State?

Table 1: Skills needed to be Acquired by Technology Education Students in TVET Institutions.

S/N	Engineering Skills	Lecturers' N = 86			Students' N = 92		
		$\bar{X}$	SD	Remark	$\bar{X}$	SD	Remark
	Ability to read and interpret engineering/building drawing and symbols.	3.05	0.89	Agree	2.93	0.83	Agree
	Skills in operating basic machine tools.	2.85	0.81	Agree	2.71	0.79	Agree
	Competence in electrical installation, wiring and troubleshooting of circuits.	2.83	0.80	Agree	2.75	0.80	Agree
	Proficiency in welding and fabrication techniques.	2.65	0.76	Agree	2.59	0.76	Agree
	Skills in bricklaying concreting and other construction operations.	2.93	0.84	Agree	2.71	0.79	Agree
	Ability to diagnose and repair faults in automobile engines and systems.	2.63	0.74	Agree	2.58	0.75	Agree
	Competence in using measuring and precision instruments such as vernier caliper and micrometer.	2.60	0.71	Agree	2.54	0.73	Agree
	Skills in computer-aided design for producing 2D and 3D technical drawings.	3.00	0.87	Agree	2.87	0.81	Agree
	Ability to apply occupational health and safety practices in workshops.	2.77	0.79	Agree	2.60	0.77	Agree
	Skill in preventive and corrective maintenance of machines and equipments.	2.59	0.70	Agree	2.57	0.74	Agree
	Grand Mean/SD	**2.79**	**0.79**		**2.69**	**0.76**	

Source: Field Survey, 2026

From Table 1 above, it was observed that the respondents agreed with all the variables highlighted as types of engineering skills that are needed to be acquired by technology education students in TVET Institutions in Rivers State as indicated by the mean values of the items which are all above the criterion mean of 2.50. Standard deviation values show closeness of the responses of the respondents.

Research Question 2: How are the available workshop facilities influencing engineering skills acquisition among technology education students in TVET institutions in Rivers State?

Table 2: How Available Workshop Facilities can Influence Engineering Skills Acquisition among Technology Education Students in TVET Institutions

S/N	Available Workshop Facilities	Lecturers' N = 86			Students' N = 92		
		$\bar{X}$	SD	Remark	$\bar{X}$	SD	Remark
	Provide opportunities for repeated hands – on practice of technical skills.	2.69	0.84	Agree	2.58	0.70	Agree
	Make it possible to acquire safety skills through the use of PPE and safety devices.	2.71	0.85	Agree	2.53	0.67	Agree

	Determine the types of engineering skills students can acquire.	2.81	0.86	Agree	2.61	0.73	Agree
	Enable instructors to demonstrate skills for students to observe and imitate.	3.00	0.89	Agree	2.71	0.78	Agree
	Allow students to receive immediate feedback and correction during practice.	2.75	0.86	Agree	2.59	0.71	Agree
	Help students develop confidence in operating machines and tools independently.	2.82	0.87	Agree	2.65	0.75	Agree
	Expose students to modern/industry standard equipment used in the world of work.	2.59	0.79	Agree	2.52	0.66	Agree
	Affect the quality of competently based assessment of students practical skills.	2.66	0.81	Agree	2.59	0.74	Agree
	Influence students ability to move from theoretical knowledge to practical performance.	3.01	0.90	Agree	2.84	0.80	Agree
	Affect the ration of students to functional machines during practical classes.	2.86 8	0.83	Agree	2.55	0.69	Agree
	Grand Mean/SD	**2.78**	**0.85**		**2.62**	**0.79**	

Source: Field Survey, 2026

From Table 2 it was observed that all the variables highlighted was agreed by the respondents as how available workshop facilities influence engineering skills acquisition among technology education students in TVET Institution in Rivers State. This is revealed by the mean values of the variables highlighted which are all above the criterion mean of 2.5. Standard deviation values show homogeneity in the responses of the respondents.

Research Question 3: What are the influence of students' industrial training/work experience on their acquisition of engineering skills through industrial technology education in TVET institutions in Rivers State?

Table 3: Influence of Students Industrial Training/Work Experience on Acquisition Engineering Skills of Students in TVET Institutions.

S/N	Influence of IT/Work Experience	Lecturers' N = 86			Students' N = 92		
		$\bar{X}$	SD	Remark	$\bar{X}$	SD	Remark
	Exposing students to modern machines and tools used in real industries.	2.93	0.89	Agree	2.62	0.83	Agree
	Enabling students to acquire skills in preventive and corrective maintenance of equipment.	2.81	0.79	Agree	2.57	0.80	Agree
	Enabling students to learn industry standard procedures not taught in school workshops.	2.65	0.86	Agree	2.58	0.81	Agree
	Improving students speed and accuracy in performing engineering operations.	2.88	0.89	Agree	2.64	0.83	Agree
	Helping students develop troubleshooting and problem-solving skills on actual jobs.	2.59	0.80	Agree	2.53	0.78	Agree
	Exposing students to workplace safety culture and compliance practice.	2.61	0.83	Agree	2.57	0.80	Agree
	Allowing students to receive supervision and feedback from experience personnel.	2.73	0.87	Agree	2.65	0.85	Agree
	Bridging the gap between theoretical knowledge acquired in school and practical application.	2.64	0.85	Agree	2.60	0.82	Agree
	Enhancing students' confidence to handle	3.04	0.92	Agree	3.00	0.89	Agree

technical tasks independently.						
Exposing students to teamwork, work ethics and professional conduct in industry.	2.57	0.79	Agree	3.54	0.79	Agree
Grand Mean/SD	**2.75**	**0.84**		**2.63**	**0.75**	

Source: Field Survey, 2026

Table 3 above showed that all the variables highlighted are the influence of Students Industrial Training/Work Experience on their acquisition of engineering skills through industrial technology education in TVET Institutions in Rivers State. This is indicated by the mean values of all the variables highlighted which are above the criterion mean of 2.50. Standard deviation values obtained for these variables revealed homogeneity in the responses of the respondents.

Hypothesis 1: There is no significance difference in the mean responses of lecturers and students on types of engineering skills that are needed to be acquired by technology education students in TVET institutions in Rivers State.

Table 4: t-test Analysis on the Responses of Lecturers and Students on Types of Engineering Skills to be Acquired by Technology Education Students

Groups	$\bar{x}$	SD	N	Df	P	t-cal	t-crit	Decision
Lecturers'	2.79	0.79	86					
				176	0.05	0.19	1.96	Accepted
Students'	2.69	0.76	92					

The information on Table 4 shows that t-calculated is 0.19 while t-critical is 1.96. Based on the analysis, the value of t-calculated is less than the value of t-critical. This indicates that the null hypothesis is accepted, hence there is no significant difference in the mean responses of lectures and students on types of engineering skills that are needed to be acquired by technology education students in TVET institutions in Rivers State.

Hypothesis 2: There is no significant difference in the mean responses of lecturers and students on how available workshop facilities influence engineering skills acquisition among technology education students in TVET institutions in Rivers State.

Table 5: t-test Analysis on the Responses of Lecturers and Students on how Available Workshop Facilities Influence Engineering Skills Acquisition of Students

Groups	$\bar{x}$	SD	N	Df	P	t-cal	t-crit	Decision
Lecturers'	2.78	0.85	86					
				176	0.05	0.13	1.96	Accepted
Students'	2.62	0.79	92					

The information on Table 5 shows that t-calculated is 0.13 while t-critical is 1.96. Based on the analysis, the value of t-calculated is less than the value of t-critical. This indicates that the null hypothesis is accepted, hence there is no significant difference in the mean responses of lecturers and students on how available workshop facilities influence engineering skills acquisition among technology education students in TVET institutions in Rivers State.

Hypothesis 3: There is no significant difference in the mean responses of lecturers and students on the influence of Students Industrial Training/Work Experience on their acquisition of engineering skill through industrial technology education in TVET institutions in Rivers State.

Table 6: t-test Analysis on the Responses of Lecturers and Students on the influence of students Industrial Training/Work Experience on their Acquisition of engineering skills.

Groups	$\bar{x}$	SD	N	Df	P	t-cal	t-crit	Decision
Lecturers'	2.75	0.84	86					

				176	0.05	0.15	1.96	Accepted
Students'	2.63	0.75	92					

The information on Table 6 shows that t-calculated is 0.15 while t-critical is 1.96. Based on the analysis, the value of t-calculated is less than the value of t-critical. This indicates that the null hypothesis is accepted, hence there is no significant difference in the mean responses of lecturers and students on the influence of Students Industrial Training/Work Experience on their acquisition of engineering skills through industrial technology education in TVET institutions in Rivers State.

Findings of the Study

The following were the findings of the study:

1. Ten engineering skills were being identified by the respondents as types of major engineering skills that are needed to be acquired by technology education students in TVET institutions in Rivers State.
2. The respondents agreed that available workshop facilities can influence engineering skills acquisition among technology education students in TVET institutions in Rivers State.
3. Students Industrial Training/Work Experience can play a major role in influencing students engineering skills acquisition through industrial technology education in TVET institutions in Rivers State.

Discussion

Types of engineering skills that are needed to be acquired by Technology Education Students' in TVET Institutions in Rivers State.

The results as presented in Table 1 above revealed that Industrial technology education programme is a training programme that can help students to acquire engineering skills in TVET institutions in Rivers State. Industrial technology which is an aspect of TVET equips students with engineering skills needed to be proficient in the workplace. This findings agrees with Fraser and Parker (2025) who in their study stated that types of engineering skill that technology education students who specialized in any of the industrial technology education related areas required to acquire during their training period include; cognitive/analytical engineering skills, design and production skills, digital and emerging technology skills, safety quality and maintenance skills.

The result of the study further found that there is no significant difference in the mean responses of lecturers and students on types of engineering skills that are needed to be acquired by technology education students in TVET institutions in River s State. This signifies that engineering skills if adequately acquired by technology education students in TVET institutions will help them to gain employment or become self-reliant upon graduation. The acquired engineering skills will keep the students to be readily employed in the industries.

How the Available Workshop Facilities Influence Engineering Skills Acquisition among Technology Education Students in TVET Institutions in Rivers State

From Table 2 the finding indicate that for technology education students offering programme in any of the specialized areas in industrial technology education to acquire effective engineering skills that adequate workshop facilities must be made available for effective training of the students in the workshops. This findings is in line with Haruna and Wale (2025) who stated that to effectively acquire engineering skills by technology education students that adequate workshop facilities must be available, that workshop facilities are "engine room" of industrial technology education programme. This finding also conforms with the view of Ogendu and Umejuru (2026) who opines that without workshop facilities skills acquisition stays at the cognitive stage, students can only talk about skills, they will not perform them.

The result of the study further found that there is no significant difference in the mean responses of lecturers and students on how available workshop facilities influence engineering skills acquisition among technology education students in TVET institutions in Rivers State. This signifies that without workshop facilities students undergoing training in technology education may not be able to carry out practical operations in the workshop.

Influence of students' industrial Training/Work Experience on their Acquisition of Engineering Skills through Industrial Technology Education in TVET Institutions in Rivers State.

The findings as presented in Table 3 revealed that students Industrial Training/Work Experience is a crucial factor that influences skills acquisition of students in industrial technology education programme. This finding agrees with Galadima and Akpan (2025) who stated that Students Industrial Training is the bridge between school workshop and real industry. The finding is supported by Tamuno and Egbe (2026) who postulates that the influence of Students' Industrial Training to students engineering skills acquisition in TVET institutions include that it provides real industry exposure beyond school workshops.

The result of the study further found that there is no significant difference in the mean responses of lecturers and students on the influence of Students' Industrial Training/Work Experience on their acquisition of engineering skills through industrial technology education in TVET institutions in Rivers State. This signifies that exposing students' to Industrial Training during their training programme will enable them to build confidence and professional identity, and also exposes them to emerging technologists and specialization in their areas of specialization in technology education programme.

Conclusion

This paper investigated the impact of Industrial Technology Education on Acquisition of Engineering Skills among Technology Education students in TVET institutions in Rivers State. Based on relevant literatures that were explored for deeper insight on the acquisition of engineering skills among students offering programmes in Technology Education related areas, the general findings from respondents indicated that access to functional workshop, exposure to modern equipment particularly in Industrial Training, directly improve students competencies in machine operation, fault diagnosis and adherence to safety and quality standards in TVET institutions in Rivers State.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. TVET institutions should ensure that they prioritize modernizing workshop with functional industry-standard machines and tools.
2. Federal and State Ministries and NBTE should ensure that adequate funds are allocated for equipment procurement, regular maintenance and replacement of obsolete tools and equipment.
3. Co-ordinators of SIWES programme in TVET training institutions in Rivers State should ensure that technology education students are posted to industries that are related to their area of specialization for their Industrial Training/Work Experience programme.

References

Agwi, V.I.A. & Ogadema, B. O. (2025). The role of Industrial Technology in creation of Jobs for technology education students in Delta State. *Journal of Education in Developing Areas.* 6(1), 30 – 45.

Akor, E. F. & Owuga, P. N. (2024). Status of workshop facilities in technical colleges in South – South, Nigeria. *Journal of Industrial and Technology Education*. 5(1), 60 – 75.

Donelly, S. G & Green, K. K. (2024). Engineering Skills required by technology education graduates for digital jobs opportunities. *https//www.edu.org*

Ede, F. N. & Mark, O. A. (2025). Technology education students perception on their challenges during Students Industrial Work Experience Programme in Akwa-Ibom State. *Journal of Vocational and Technology Education*. 4(1), 100 – 115.

Edemede, O. S & Mark, E. (2025). Impact of adequate workshop facilities on engineering skills acquisition of technology education students in Rivers State. *Journal of Academic Excellence. 9*(1), 80 – 95

Eke, B. N & Taiwo, M. A. (20240. Strategies for improving the quality of practical skills training of students in technical colleges in Rivers State. Port Harcourt. *Journal of Education*. 7(1), 10 – 25

Federal Republic of Nigeria (2013). *National Policy on Education (Reversed 6th Edition*). Nigerian Educational Research and Development Cruncile (NERCD).

Fraser, U & Parker, W. T. (2025). Engineering skills required by technology education students for self-reliance in the 21st century. *https//www//dox.12250016.*

Galadima, E. M. & Akpan, E. O. (2025). The role of TVET institutions SIWES Co-ordinators for effective SIWES program in Delta State. *https//www.edu.org.*

Haruna, A. A. & Wale, K. E. (20230. Achieving the objective of industrial technology education programmes through industry – school collaboration in Akwa-Ibom State. *https//www.edu.org.*

Huges, W. O. & Bread, A. K. (2025). Engineering skills acquisition in technology education pogrammes: Issues and challenges. *https//www.edu.org.*

La, A. A. & Idris, W. K. (2026). Strategies for effective Students Industrial Training programme in Nigeria: Issues and way forward. *https//www.eduu.ng.*

Maduka, A. I. & Uwem, L. E. (2026). Industrial technology education: A useful means for solving the problem of unemployment in Rivers State. *https//.www.edu.org.*

Ogendu, B . N & Umejuru, K. T. (2026). Influence of workshop facilities in engineering skills acquisition among technology education students in TVET institutions in Rivers State. *Journal of Vocational and Technology Education.* 7(1), 60 – 75.

Okenwa, A. S. & Izuchukwu, T. N. (2025). Practical skills training needs of technology education students during Industrial Training programme in Bayelsa State. *https//www.edu.org.*

Okonkwo, C. T. & Uzorka, O. K. (2023). Strategies for achieving practical skills training of students in technical colleges in Enugu State. *https//www.edu.org.*

Okowa, F. O. & Ibe, C. T. (2026). Industrial technology education as a useful mean for empowering technology education students for self-employment in the 21st century. *Journal of Academic Excellence.* 7(1), 30 – 45.

Rashford, C. & Hills, G. F. (2025). Factors influencing skills acquisition of industrial technology education students in Ghana. *https//www.doc.skill.2001540061.*

Tamuno, E. A & Egba, M. N. (2020). The influence of industrial training programme on technology education students skills acquisition in Rivers State. *Journal of Industrial Technology Education.* 4(1), 80 – 95

Willcock, J. E. & Karabi, U. A. (2025). Strategies for closing the persistent gap between industries demand and graduates competence in Cross-River State. *Journal of Vocational and Technology Education*. 8(1), 20 – 35.